

MAEKAWA et al. -- Appln. No. 10/069,274
Attorney Docket: 040258-0290685

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REMARKS

Claims 1-9, 11-19 and 21-27 are pending. By this Amendment, claims 10 and 20 are canceled without prejudice or disclaimer and claims 1, 8, 9, 11, 18, 19, 21 and 25-27 are amended. Reconsideration in view of the above amendments and following remarks is respectfully requested.

A PTO-1449 was submitted with the application on the February 25, 2002 filing date. The PTO-1449 listed five Japanese references cited in the International Search Report (ISR). A copy of the ISR and the cited Japanese references were also submitted with the application on February 25, 2002. As of this date, Applicants undersigned representative has not yet received an initialed, signed and dated copy of the February 25, 2002 PTO-1449. The Examiner is respectfully requested to consider each reference, initial, sign and date the PTO-1449 and return a copy of such with the next Office Action in accordance with MPEP §609.

Claims 1-9 and 21-26 were rejected under 35 U.S.C. §102(b) over Shu et al. (U.S. Patent 5,972,803). The rejection is respectfully traversed.

Claim 1 recites a method of fabricating of a semiconductor device. The method includes forming a first insulation film on a substrate by a spin-on process. The method further includes partially curing the first insulation film by applying a first thermal energy corresponding to a temperature of 380-500°C over a duration of 5-180 seconds. The method also includes forming a second insulation film directly on the first insulation film by a spin-on process and completely curing the first insulation film and the second insulation film by applying a second thermal energy larger than the first thermal energy.

Shu et al. disclose a method of low temperature curing of a dielectric film in a short processing time by using infrared radiation energy of a lamp. See column 1, lines 66-column 2, line 21. It is an object of Shu et al. to avoid the problem of recrystallization of aluminum that occurs when aluminum is heated at a temperature of around 400°C and the associated problems of electromigration. See column 1, lines 48-52 and 59-65. Shu et al. thus use the infrared energy of the lamp to avoid these problems discussed in the BACKGROUND section of their disclosure.

The dielectric film 22 of Shu et al. is completely cured when it is formed in the state shown in Figure 2. The dielectric film 22 is also certainly completely cured in the state shown in Figure 3 immediately before the formation of the next dielectric film 24. See column 2, line 65-column 3, line 2. As shown in Figure 4, the surface of the dielectric film

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22 is planarized with respect to the state shown in Figures 2 and 3. The planarization process cannot be applied when the dielectric film 22 is in a partially cured state. See column 3, lines 3-5.

Shu et al. do not disclose or suggest forming a first insulation film on a substrate by a spin-on process and partially curing the first insulation film, as recited in claim 1. As discussed above, the dielectric film 22 of Shu et al. must be in a completely cured state in order for the dielectric film 24 to be formed thereon. Shu et al. thus also do not disclose or suggest completely curing a first insulation film and a second insulation film by applying a second thermal energy, as recited in claim 1.

As Shu et al. do not disclose or suggest each and every feature of claim 1, Shu et al. cannot anticipate or render obvious claim 1.

Claims 2-9 recited additional features of the invention and are allowable for the reasons discussed above with respect to claim 1.

Claim 21 recites a method of fabricating a semiconductor device having a layered structure including partially curing the first insulation layer forming one of the plurality of layers, forming one or more insulation layers on the first insulation layer to form a layer structure and completely curing the layered structure.

As discussed above, Shu et al. do not disclose or suggest partially a curing a first insulation layer. The dielectric film 22 of Shu et al. is completely cured prior to formation of the second dielectric film 24. Accordingly, Shu et al. cannot anticipate or render obvious claim 21.

Claims 22-26 recite additional features of the invention and are allowable for the same reasons discussed above with respect to claim 21 and for the additional features recited therein.

Reconsideration and withdrawal of the rejection of claims 1-9 and 21-26 over Shu et al. are respectfully requested.

Claims 10 and 27 were rejected under 35 U.S.C. §103(a) over Shu et al. The rejection is respectfully traversed.

Claim 10 has been canceled without prejudice or disclaimer thus rendering moot the rejection.

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Claim 27 recites additional features of the invention and is allowable for the same reasons discussed above with respect to claim 21 and for the additional features recited therein.

Reconsideration and withdrawal of the rejection of claim 27 over Shu et al. are respectfully requested.

Claims 11-20 were rejected under 35 U.S.C. §103(a) over Shu et al. in view of Watatani (U.S. Patent 6,153,511). The rejection is respectfully traversed.

Claim 11 recites a method of fabricating a semiconductor device including forming a first insulation film on a substrate by a spin-on process and partially curing the first insulation film. The method further includes forming a second insulation film directly on the first insulation film by a spin-on process and completely curing the first insulation film and the second insulation film. The method further includes patterning the second insulation film and etching the first insulation film while using the second insulation as a mask.

As discussed above, Shu et al. do not disclose or suggest partially curing a first insulation film, nor do Shu et al. disclose or suggest completely curing a first insulation and a second insulation film, as recited in claim 11. In addition, it is respectfully submitted that Watatani fails to cure the deficiencies of Shu et al. with respect to claim 11 and even assuming it would have been obvious to combine the references, the combination would not have result in the invention of claim 11.

Claims 12-20 recite additional features of the invention and are allowable for the same reasons discussed above with respect to claim 11 and for the additional features recited therein.

Reconsideration and withdrawal of the rejection of claims 11-20 over Shu et al. in view of Watatani is respectfully requested.


In view of the above amendments are remarks, Applicants respectfully submit that all of the claims are allowable and that the entire application is in condition for allowance.

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Should the Examiner believe that anything further is desirable to place the application in better condition for allowance, the examiner is invited to contact the undersigned at the telephone number listed.

Respectfully submitted,
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